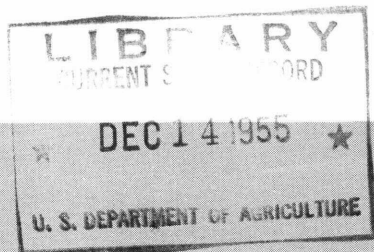


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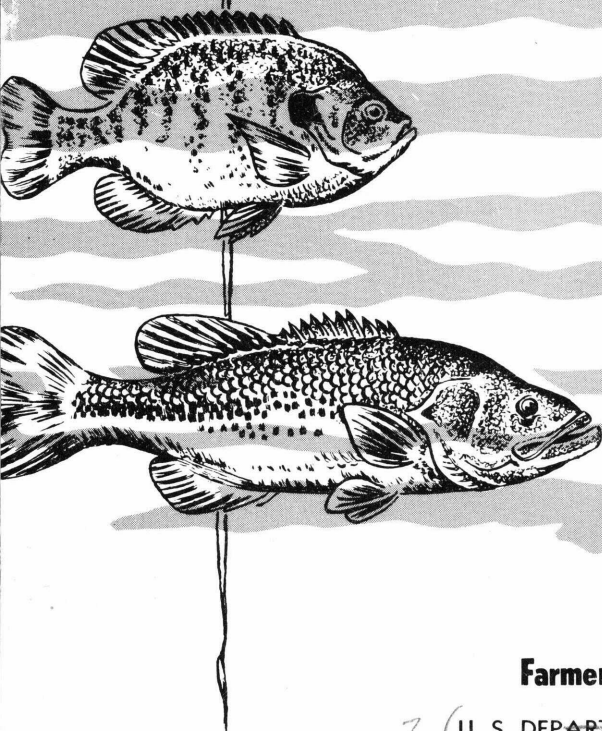


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**Managing**

# Farm Fishponds

**for Bass and Bluegills "**



**Farmers' Bulletin No. 2094 )**

7 ( U. S. DEPARTMENT OF AGRICULTURE )

**A** FISHPOND is a delightful part of a farm or ranch. Where a good site exists for a pond, it makes good use of the land. The impounded water often has other uses too. It adds beauty to the farm and provides recreation for farmers, ranchers, and their friends.

Fishponds are profitable when they are managed well. To produce the most income and home use, they must afford good fishing year after year. Most disappointments result from mistakes in management.

This bulletin points out the importance of good sites and the necessity for erosion control, proper stocking, and weed control. It tells how to have good fishing by ample fertilization. It also explains the treatment of some common pond troubles. By following these essential guides, you can be assured of a lasting pond that may be fished many times a year.

This bulletin <sup>8</sup>supersedes Farmers' Bulletin 1983, Farm Fish-  
ponds For Food and Good Land Use.

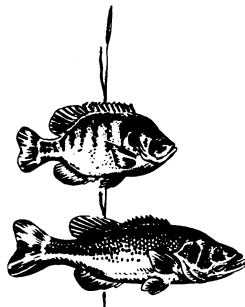
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**Managing**

# Farm Fishponds

**for Bass and Bluegills**

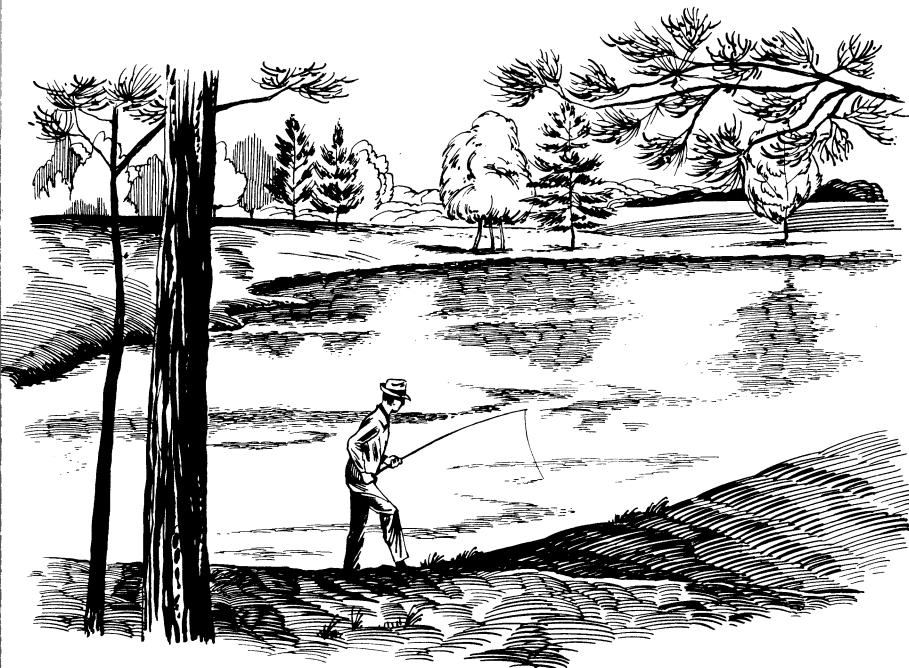


BY VERNE E. DAVISON, *biologist, Soil Conservation Service*

**F**ISHPONDS are accepted more and more as profitable and delightful features of farms and ranches. They make good use and safe use of the land—basic steps in the conservation of soil and water. Good fishponds expand the farm economy and furnish food to both rural and urban fisherpeople—men, women, and children alike. They can also furnish water for livestock and for fire protection

and provide swimming, boating, and other recreation. For many pond owners, the sale of permits for fishing is a source of income.

Many farms and ranches have a suitable site for a good fishpond. Some have two or even several sites. All ponds will produce some fish. They will produce more if they are built right and managed right. They should be free of waterweeds and use-



**Fishponds make good use of land.**

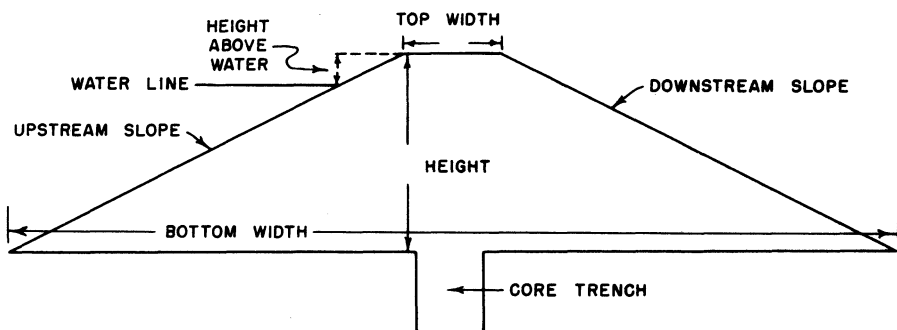
less fish. And the watershed above the pond should be protected with soil conservation measures that control erosion and runoff.

A high-yielding fishpond is a combination of the water's natural productivity, added fertility when needed, and man's management. Your pond can be one that is easy to manage or one that cannot be managed well with any amount of effort. The difference is in the site you select and the way you build

ically. Too much water washes the fertilized water out through the spillway.

*A site where water can be impounded successfully.* Sufficient depth for the pond, suitable soil, and a good site for the dam are necessary factors.

In the South, a depth of 4 feet is sufficient if the water level can be expected to remain constant, but 6 feet or more is usually better. In the Central States, a pond should be 8 to 10 feet deep. In the North, make



**Build a safe dam.**

the pond and stock it. After that, good management is the key to successful production of bass and bluegills—and to satisfactory fishing—in your farm or ranch pond.

### Selecting the Site

There are two important things to consider when you select a fishpond site:

*A watershed of favorable size.* A site for a good fishpond has a relatively small watershed from which little runoff water and silt will enter the pond. There must be a satisfactory supply of water—a small spring flow or enough silt-free runoff to fill the pond and replenish the water lost by seepage and evaporation. Be sure there is enough water to fill the pond in a year or less. On the other hand, if the flow is so large that it fills the pond in less than a month, you cannot fertilize it econom-

ically. Too much water washes the fish from freezing in winter.

Before you build a pond, make sure your soil will hold water against excessive seepage. The soil must be suitable for the pond bottom as well as for the dam. Your local soil conservation district will help you check your watershed and select a suitable site.

### Building the Pond

The best ponds require careful attention to the items that follow. Your local soil conservation district technician will help you with them.

*A safe dam* has a top width of at least 10 feet. This width makes the dam safe from muskrats which are likely to burrow into it. And it gives a good roadway for crossing. A safe dam must also have adequate bottom width, side slopes, and height above water. These depend on kind of soil,

size of the watershed, and the width of the flood spillway.

Before you build a dam from the ground up, you must build a part of it from the ground level down. Below the surface, you may have gravel beds or layers of sand and sometimes old logs or other organic matter. These are porous and would allow water to seep rapidly beneath the dam. A core-trench is needed to cut off this seepage.

The trench should be the full length of the dam, and dug down to watertight soil. It may be 4 feet wide or as wide as the machine cuts. You can blow out the trench with dynamite if the site is too wet and soft for machinery. Then fill the trench with the same kind of soil you use in the dam. This way the core trench and dam become one solid fill.

*Wide spillways* are necessary for fishponds. When the flow of water through the spillway is more than 6 inches deep, many of your usable-size fish will escape. Even so, do not use a screen across the spillway. It will get clogged with fine trash, stop the flow, and endanger the dam. Of course, thousands of little fish will

escape even in shallow flows through the spillway, but they will be replaced by thousands more.

*Shallow water* at the edges is troublesome. It grows too many weeds, and it protects too many little fish from the bass. Very few pounds of fish are produced in shallow water.

You can get rid of shallow water by digging the edges deeper or by filling them in. Usually, a combination of these two methods is best. A minimum depth of 18 to 24 inches is good, but 3 feet is better.

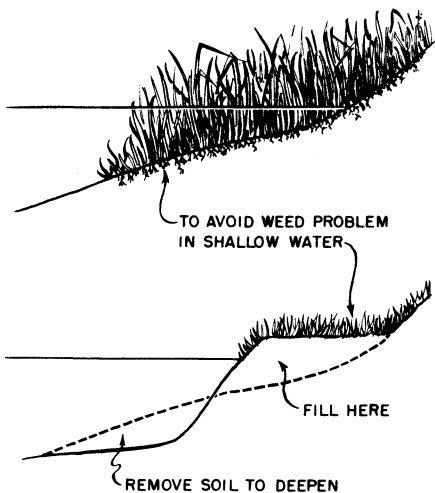
You can manage your pond much more easily if you eliminate all shallow water. Getting rid of shallow places is worth more than it costs.

*All trees and brush* should be cut from the area to be covered with water. The stumps, too, must be removed from the dam site. If possible, also remove the stumps and snags from the pond bottom, especially where the depth is to be less than 5 feet. This leaves the bottom smooth for seining, an important activity in management.

A strip 20 to 30 feet back from the pond edge should be cleared of all trees and brush. This reduces the fall of leaves into the pond, and enables you to have a grassy band around the pond from which to fish.

A *drainpipe* is required by law in many States as a public-health measure. In others, it is a matter of choice. A drainpipe does have value. If you have a heavy rain while the dam is being built, a drainpipe will protect it. Drainpipes are also useful for removing troublesome fish populations. It is often, however, more economical to kill all the fish without draining off the water, especially when water is not available for refilling quickly.

An *overflow pipe* or *trickle tube* controls the normal water level of the pond and allows the regular overflow to escape without drowning the grass in the flood spillway. It may be connected to the drainpipe or the trickle tube may be built separately.



Deepen shallow edges to avoid waterweed problems.

*Construction work* should leave the pond attractive. Do not mar its beauty by excavating soil from above the waterline, except for the flood spillway or in a carefully selected "borrow pit."

### Controlling Erosion and Runoff

The life of your pond depends largely on whether the land above the pond is protected from soil erosion. The work and expense of building the pond, stocking it with fish, and managing it will be wasted unless the watershed is protected. Silt fills a pond. Muddy water reduces fish production. Floodwater replaces fertilized water and may carry your usable-size fish out through the spillway. All of these problems can be reduced or eliminated by soil and water conservation measures.

A good vegetative cover protects the soil and holds it in place. It also reduces runoff by allowing more of the rain to soak into the soil.

The soil conservationist in your district may suggest a diversion ditch and dike to carry floodwater and muddy water around your pond where erosion and runoff cannot be controlled. He can also show you how to bring more water into your pond if your natural watershed is too small.

Roads are serious sources of both muddy water and silt. Road water should be diverted wherever possible. Keeping farm roads on the contour and protecting the roadsides with a vegetative cover help to control erosion.

As soon as your dam is completed, you should get some kind of vegetation growing on it. Be sure to get a good grass sod established quickly in the spillway too. Usually, a straw or grass mulch will be needed on the side of the spillway that is cut into subsoil.

Whether or not to fence livestock away from your pond is a question you must decide. Grazing animals



Eroding land ruins pond waters.





Soil conservation protects pond waters.

help control weeds and grass along the water's edge, thus saving hand-work. On the other hand, fencing gives better sanitation and less muddying of the water. If livestock muddy the whole pond by wading, you must fence them out in order to fertilize successfully.

### Stocking With Fish

A fishpond must be stocked correctly and with the right kinds of fish if it is to provide good fishing quickly and continuously.

A combination of large-mouth bass and bluegills is dependable for warm-water ponds larger than  $\frac{1}{4}$  acre. If the surface temperature often reaches 85° F. or higher during the summer, you have a warm-water pond. Bluegills spawn frequently all summer in these warm waters. The bass feed largely on little fish, including their own young. Thus, they help prevent overpopulation in the pond. Large-mouth bass do not grow satis-

factorily unless they have small fish, such as bluegills, to feed upon.

Cold-water ponds are scarcely suitable for bass and bluegills. The bluegills spawn over too short a period to feed bass well. Rainbow or brook trout are usually grown in spring-fed ponds or other cold-water ponds. Trout do well in waters with temperatures up to 75° F.

Many pond owners want catfish, crappie, and other kinds of fish in their farm fishponds. These and most of the other desirable American species have been tried in various combinations at the Alabama Agricultural Research Station. These experiments showed that the bass-bluegill combination produces the best fishing and the most pounds of fish per acre with the least trouble. Other species were seldom successful.

Crappie and catfish can be stocked with the bass and bluegills in large "irrigation reservoirs," such as those in the rice area of Arkansas, Louisiana, Mississippi, and Texas. The





**Bass and bluegills are best for warm-water ponds.**

fish population diminishes as the water is lowered in summer, but the fish grow rapidly again when the reservoir is refilled. You do not have this essential control of crappie and catfish in the usual fishpond.

Carp, catfish, or buffalo are stocked alone or together in some warm-water ponds with varying success. One method is to obtain usable-size fish from large seining operations, haul them sometimes long distances, and dump them in the pond for immediate fishing at a small fee per day. A more productive method is to grow fingerling catfish, buffalo, or carp to market size in ponds that are drained and restocked annually or more often. In rice-growing areas, this method may be used in a rotation with rice.

Here are the essential things you need to know about stocking your pond with bass and bluegills:

**Stocking rates.** If too many fish are stocked, there will not be enough food for each to reach usable size. The stocking rate, therefore, affects the size of fish and the success of fishing.

A good stocking rate for bass and bluegill ponds is 1,000 to 1,500 bluegills and 100 to 150 large-mouth bass per surface acre for well-fertilized ponds, or 500 bluegills and 50 bass for ponds of average fertility. Even this lower stocking rate is too high for ponds of less than average fertil-

ity. With these stocking rates, you should produce about 4 pounds of bluegills to each pound of bass. Bluegills should weigh from 3 to 6 ounces each and bass from 12 ounces to 1 pound when you begin fishing 12 to 18 months after stocking. These stocking rates are intended to give the usable-size fish 75 percent or more of the pond's fish food, thus preventing an overpopulation of smaller fish in the succeeding years.

In the Western States successful fertilization is not well developed for either cold waters or highly alkaline waters. Until the correct chemistry is worked out for these waters, and their potential yields are measured, stocking rates remain uncertain.

**Stocking dates.** The usual practice is to stock bluegills any time from August to January, preferably as early as possible. Stock bass the next March, April, May, or June—as soon as the new hatches are large enough to transfer from the hatchery. Bluegills stocked between January and July seldom produce good fishing.

**Avoid or kill all native (wild) fish before stocking.** Native or wild fish will populate your pond before hatchery fish arrive if you have a pair or two in the pond during the summer. And if you put in a few adult bluegills ahead of stocking, they will overpopulate the pond too. In other words, you cannot expect good fishing if you let nature stock your pond. A pond that becomes seriously overstocked can be prepared for correct stocking by killing all the fish with rotenone. You will need 3 pounds of 5-percent rotenone for each acre-foot of water. Most State laws govern the use of fish poisons. Therefore, you may need a permit from your State Fisheries Division.

**Be sure your stocking is successful before you begin fishing the pond.** You cannot be certain that your stocking is successful until you have proof that all is well. Fish from the hatchery occasionally arrive at the pond in poor condition. This may be

due to your failure to follow the instructions given by the hatchery or to some contamination in the vessel you take to meet the hatchery truck.

You may have a partial or complete die off as a result of poisoning by insecticides such as DDT, toxaphene, aldrin, or chlordane, used on nearby crops. Or losses may result from a low oxygen content of the water. If you see the fish in distress, you may save them by immediately applying 50 to 100 pounds of superphosphate per acre. The superphosphate enables the microscopic plants to begin growth and give off oxygen, thus aerating the water. Other accidents and disease occasionally upset the stocking of ponds. If you lose more than half of the pond's poundage, it is best to kill the remaining fish and restock.

Therefore, you anxiously await the spring when your bass are 1 year old. If everything is well, they will spawn and hatch their young success-

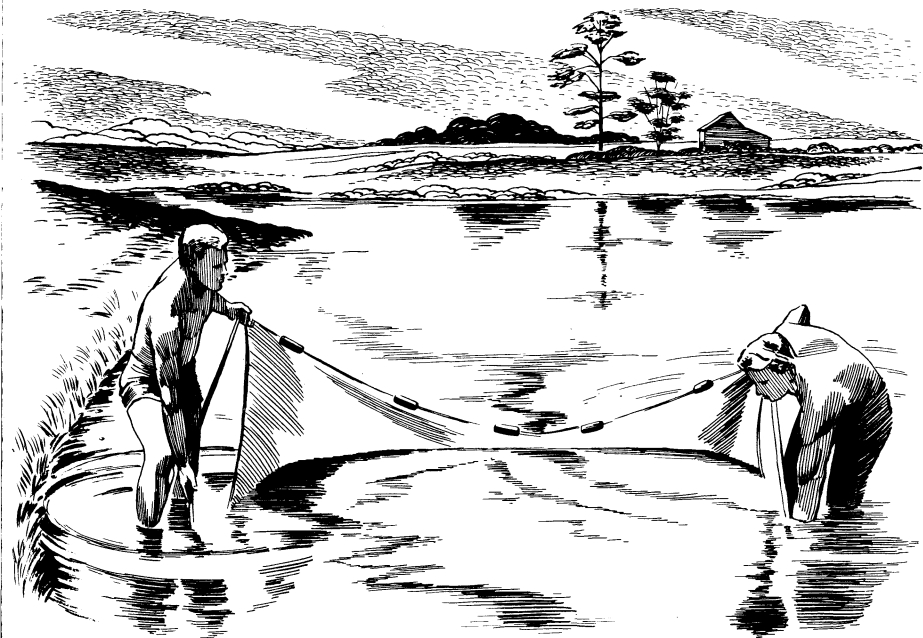
fully. Use a minnow seine at the edge soon after hatching time—April or May in the South, June or July in the North—to test this. If you catch small bass in the seine, your bass stocking is successful. Bluegills seldom fail.

If you fail to catch small bass after this all-important spawning season, you have trouble. Your bass-bluegill weight ratio is not right, and you need a new stocking of bass. You may need to kill all the fish and begin again.

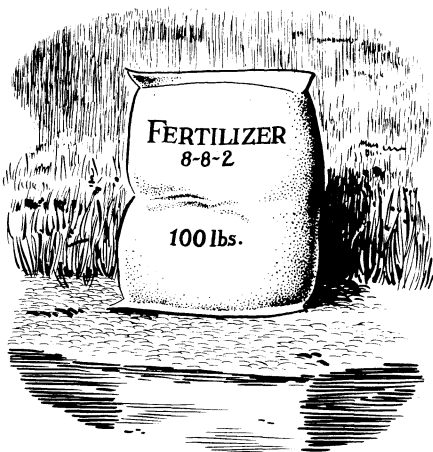
### Using Fertilizer

High fertility of pond water accomplishes three desirable objectives: (1) Increases fish production and makes it possible to catch more fish; (2) makes possible one standard rate of stocking fish; and (3) prevents the growth of submerged waterweeds.

*High fertility increases fish production.* Fishing waters need enough



Check your bass hatch with a minnow seine.



Use fertilizer to grow more fish.

nitrogen, phosphate, and potash to grow vast numbers of microscopic plants. The microscopic plants use the fertilizer from the water and grow and multiply. Fish do not eat the fertilizer, nor do they eat the tiny plants to any extent. But they do eat the insect larvae and other water animals that feed on these tiny plants.

It takes 4 to 5 pounds of insect larvae for each pound of bluegills; and in turn 4 to 5 pounds of little bluegills for each pound of bass. Thus the larger poundage of microscopic plants in fertilized waters provides for more insect larvae and more fish.

A well-fertilized pond supports 400 pounds or more of bluegills and bass per acre, and yields 150 to 200 pounds annually by fishing. An average pond of natural fertility supports about 150 pounds of bass and bluegills and yields only 15 to 35 pounds of fish per acre annually. Your pond is very exceptional if it needs no fertilizer added. Such ponds are usually near cattle barns where runoff water fertilizes them.

*Uniform stocking rates are possible with pond fertilization.* Since natural waters may feed as little as 25 pounds or as much as 600 pounds of fish,

you do not know how many fish to stock in them. The usual rate of 500 bluegills and 50 bass is correct only for those ponds which support a moderate poundage of fish per acre. To assure good fishing, you need to control the amount of food and stock accordingly.

*High fertility prevents the growth of submerged waterweeds.* With plenty of fertilizer, millions of microscopic plants can be grown. These plants color the water enough to prevent sunlight from reaching the pond bottom. The submerged waterweeds cannot grow without this sunlight. Further, without weeds to harbor them, all mosquito larvae are eaten by the bluegills and bass. Thus, your comfort and the public's health are protected by adequate fertilization.

### When to fertilize

The growing season of the microscopic algae is the best time to fertilize. This is from early spring well into the fall. You need to build up your pond's fertility quickly and as early as you can in the spring. Otherwise, you fail to benefit fully from the algae's growing season.

In Florida you can fertilize the year round. In the southern sections of South Carolina, Georgia, and the Gulf States the growing season begins in early February and reaches their northern sections before the first of March. In North Carolina, Tennessee, Missouri, Arkansas, and Oklahoma you usually find spring weather warm enough for fertilization during March. Warm weather extends into November in the Gulf States and through most of September in the other States, even the northern ones.

Fertilize new ponds before the hatchery fish arrive. You will want to grow a lot of insect and animal food while the weather is warm. You also need to *prevent* the start of waterweeds. Thus, you should begin to fertilize as soon as your pond begins

to fill—in spring, summer, or early fall.

Waterweeds that have already invaded your pond will use up the fertilizer you add. For this reason, kill them first (see page 10).

### Kind of fertilizer

A mineral fertilizer is best for your pond. Organic fertilizers, such as cottonseed meal, blood meal, manure, and leaves, encourage pond scum. A satisfactory analysis is 8 pounds of nitrogen, 8 pounds of phosphorus, and 2 pounds of potash per hundred pounds of fertilizer. This is known in the trade as 8-8-2. You may use a stronger fertilizer, such as 8-8-4, 10-10-5, or 12-12-4. Just be sure it has as much nitrogen as phosphorus. If you use a mixed fertilizer that has less nitrogen, add enough nitrogen to equal the phosphorus.



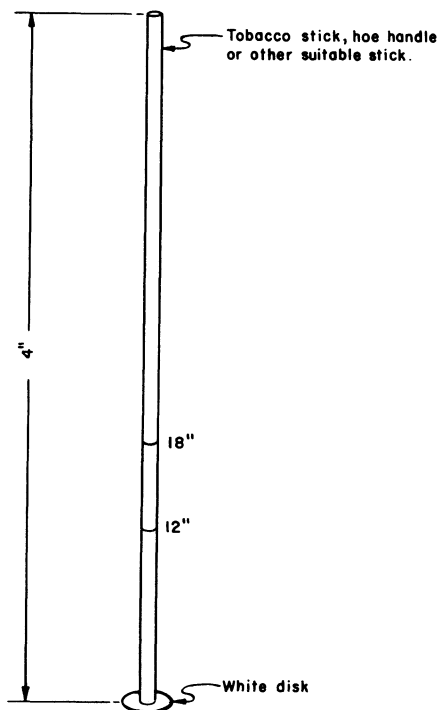
Fertilizer can be applied from a boat.

### How much fertilizer

A few unusually fertile ponds stay the right color without adding any fertilizer. But the average pond requires from 800 to 1,200 pounds of fertilizer per acre each year and the least fertile from 1,200 to 1,600 pounds. A pond that requires as little as 200 or 300 pounds is exceptional.

No one can predict exactly how much fertilizer a pond will require. Ponds need less in dry years and more when rains dilute the fertile waters. But you can fertilize correctly in any case by testing the water in your pond with a simple gadget you can make yourself.

Nail a white disk on the end of a stick. Mark the stick at 12 and 18 inches above the disk. Your pond is fertile enough when the disk goes out of sight about 12 inches below the surface. If you can see it at a depth of 18 inches or more, your pond will not feed 400 pounds of bass and bluegills per acre. You need to fertilize. The color of the water may be any shade of green or brown. That depends on the number and



A testing stick helps you fertilize correctly.

kinds of microscopic plants—green, yellow, red, or blue.

At each application, use at least 100 pounds of fertilizer per surface acre, but not more than 200 pounds. You will see benefits with your measuring disk within 3 to 7 days. In the spring you can expect to fertilize 3 to 6 times, at 10-day intervals or weekly.

When the color of the water satisfies the test, your pond is fertile enough. Watch it. When it begins to clear, test it with your white disk. Add fertilizer when it is needed to restore the correct coloration.

### How to apply fertilizer

Fertilizer can either be poured from a boat or broadcast by hand from the bank of small ponds. You need not scatter the fertilizer over all the pond. In fact, it is better not to place it in water deeper than 5 feet. A single line up one side of the pond and down the other is sufficient. Wind action and undersurface currents will mix the fertilizer throughout the pond.

The Alabama Agricultural Experiment Station recommends an alternate method of applying fertilizer. First, build a platform and submerge it about 12 inches below the pond surface. Then place the sacks of fertilizer on the platform when needed, tearing off the tops of the bags. Wind-wave action will distribute the fertilizer. One platform is enough for each 8 to 10 acres of pond surface. Add fertilizer as often as the white disk shows your pond needs it. Do not expect all the fertilizer to disappear from the platform, as some insoluble material will remain at all times.

### Waterweeds and Their Control

*All waterweeds are undesirable in fishponds.* They interfere with fishing and do not provide food for fish. They feed turtles, but not fish. Waterweeds foster the breeding of mosquitoes. They hide too many little bluegills from the bass, thus causing overpopulation of inter-



Shade out submerged waterweeds.



Graze, mow, or spray edge weeds.

mediate-size bluegills. Pond weeds may give fish a strong "fishy" flavor. When pond weeds decompose during periods of low oxygen in the water they contribute to the death of fish. Waterweeds also use up the pond's fertility.

You can prevent most waterweeds from coming into your pond easier than you can get rid of them. Chemical poisons and manual removal are only temporary controls. The weeds will return unless you make conditions unfavorable for their growth. Therefore, never forget the importance of deep edges and highly fertile water. These measures used together are the chief and cheapest means of preventing most waterweeds.

All leafy water plants are weeds to the fishpond owner. Some grow submerged below the water surface; a few float; others are marsh plants that grow in shallow water only.

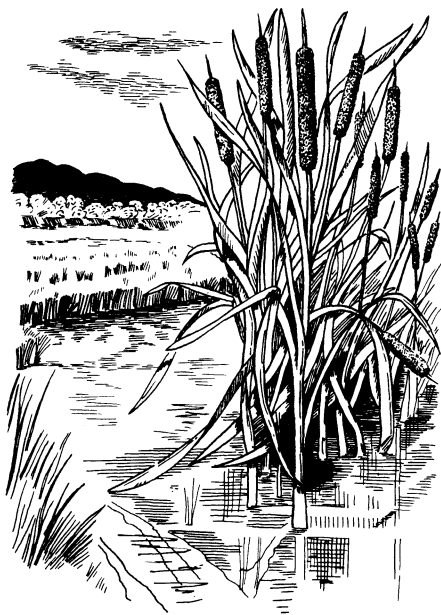
*Submerged waterweeds*, such as naias, elodea, and potamogetons, grow chiefly below the water surface, but their flowers and a few leaves may grow above it. They can be prevented by fertilization. The vast quantity of microscopic algae in fertilized ponds clouds the water and shuts out the sunlight without which the waterweeds cannot start to grow.

If these waterweeds are already established, microscopic algae cannot be increased enough, even with fertilizer, to color the water and shade out the sunlight. The weeds take up the fertilizer, and the water remains clear. Kill the weeds. Then fertilize the water.

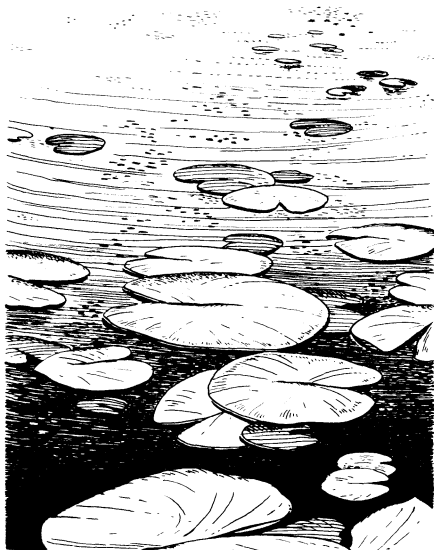
Erosion, silt, and muddiness also prevent the growth of submerged weeds, but this is a destructive, unprofitable way. Occasional "black waters" caused by organic stains also prevent these submerged weeds.

Sodium arsenite will kill submerged weeds and control them temporarily. It is a dangerous poison to humans and domestic animals, but can be applied safely. You will need the advice of your fish culturist, county agent, or Soil Conservation Service technician before you use this poison.

Submerged weeds can be killed also by winter fertilization (except where the pond is covered with ice). Pond owners, however, often despair before the kill is accomplished.



Pull cattails as they appear.



Cut off the floating leaves of plants.

Begin the treatment in late winter (January in the South). Broadcast the 8-8-2 fertilizer (or equivalent) evenly over the weedbeds at the rate of 200 pounds per surface acre. Repeat every 2 weeks until a heavy growth of pond scum covers the submerged weeds. These weeds, totally shaded, die in early to midsummer and the whole mass floats to the top, then sinks to the bottom, and is disintegrated quickly by bacteria. The process takes from 4 to 5 months before the weeds are killed and disappear.

Remember that only adequate fertilization will keep the submerged waterweeds from returning.

*Marsh plants*, such as parrotfeather, pennywort, rushes, cattails, and grasses grow at the pond edge or in shallow water. You should either get rid of them or confine them to a narrow band by deepening the edges of your pond 18 to 24 inches—3 feet is better.

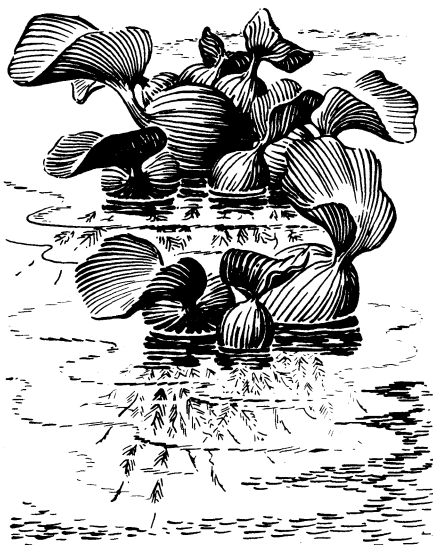
Cattails are removed easiest and best by pulling them when new seedlings start. Even old beds can be more easily controlled by pulling than by using chemical sprays.

Grasses and other edge plants are controlled by grazing or mowing or by spraying with a mixture of 2,4-D and diesel oil. A mixture of 8 ounces (1 cup) of 40-percent 2,4-D (ester form) in 5 gallons of diesel oil is standard. You can kill back all the marsh and edge plants by spraying them once or twice each summer. A second application is usually needed to finish killing weeds, shrubs, and any heavy growth of plants.

*Plants with leaves that float on the pond surface*, such as pond lilies and watershield, can be avoided by fertilizing your pond to prevent the development of seedlings. This type has roots on the pond bottom.

You can kill the plants by repeated cutting of the leaves. This starves the roots. The leaves need to be cut only slightly below the surface of the water. Five or six cuttings may be required. Just keep at it until leaves appear no longer. For big jobs, you can use a gasoline-motored mowing machine on a boat.

Sodium arsenite or 2,4-D will kill a single crop of leaves. Successful spraying is difficult, however, since



Remove floating plants.





Copper sulfate will kill filamentous algae.

the spray washes off with wave action.

Unless you fertilize enough to shade out the light, these weeds will return; or even more troublesome weeds, such as coontail, may come in heavily. You should not, therefore, try to kill these weeds unless you can make the water highly fertile.

*Floating plants*, such as water hyacinths, tiny duck weeds, and water lettuce, float on the pond surface. Their roots feed from the water rather than from the soil.

To get rid of water hyacinths, spray them every 2 or 3 weeks in summer with 2,4-D until the last one is dead. You may need to spray 6 times. Use 1 quart of 40-percent 2,4-D (water soluble) in 100 gallons of water.

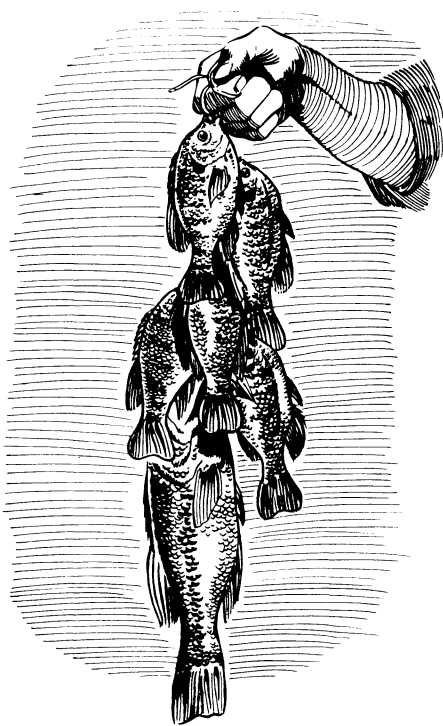
To get rid of water lettuce, kill it with sodium arsenite, using 30 pounds of powder for each surface acre of water.

To control the tiny duck weeds, allow the wind to blow them freely to the edges of the pond. These plants cover a pond where: (1) Trees, brush, or high banks prevent wind from blowing across the surface; (2) submerged weeds grow to the surface and hold the little floating plants in place;

or (3) floating logs and trash prevent wind action. Cut brush and trees from around the pond if they prevent wind action on the pond surface. Where there are both duck weeds and submerged waterweeds, poison them with sodium arsenite as for submerged weeds alone.

*Filamentous algae* (pond scum) are the stringy, hairlike plants that grow on the pond bottom and on logs and other decaying organic matter in your pond. They are of two main types—single filaments and branched filaments. Both interfere with fishing and encourage mosquito growth.

You can kill the single-filament types with copper sulfate and control them by keeping weeds, grass stems, hay, leaves, manure, and other organic matter out of the pond. Use 2 to 4 pounds of copper sulfate, or the equivalent liquid strength, for



Harvesting the crop is part of pond management.

each acre-foot of water. These single-filament algae are the same algae you grow in your pond by winter fertilization to kill the submerged waterweeds (see page 11).

Ways to prevent or control branched filamentous algae are now under study.

In short, you can control weeds best by:

- Eliminating shallow edges and marshy conditions.
- Fertilizing enough to shade the pond bottom.
- Assuring unhampered wind action on the surface.
- Frequent mowing or moderate grazing around the pond.
- Keeping organic matter out of the pond.
- Using 2,4-D in diesel oil for edge spraying.

### Fishing the Pond

Fishing is one of the most important practices in pond management. Fishing success tells you whether you

are managing your pond right. In the second year after stocking, your pond will contain its limit of fish, measured in pounds. No more weight can be grown unless you remove fish from the pond. Production will equal your harvest—take out 50 pounds of fish and 50 pounds will grow back.

You cannot have too many fish of usable size. You must, however, consider 2-ounce bluegills and 4-ounce bass as usable. You can maintain your fishing still better if you consider 1½-ounce bluegills as usable. You cannot expect all of your fishing to be rewarded with large bluegills and bass.

You never have too many fingerlings either. Fingerlings include bass up to about 4 inches in length and bluegills up to 2 inches—sizes which bass can gulp down readily. This fingerling group is the pond's supply of food for the bass. Rapid growth and heavy poundage of bass depend on a steady, heavy reproduction of little bluegills all summer. Fertilizing early in the spring, through the



A pond has three sizes of fish—fingerlings, intermediates, and usables.

summer, and into fall assures the highest production of fingerling bluegills.

### Controlling size of fish

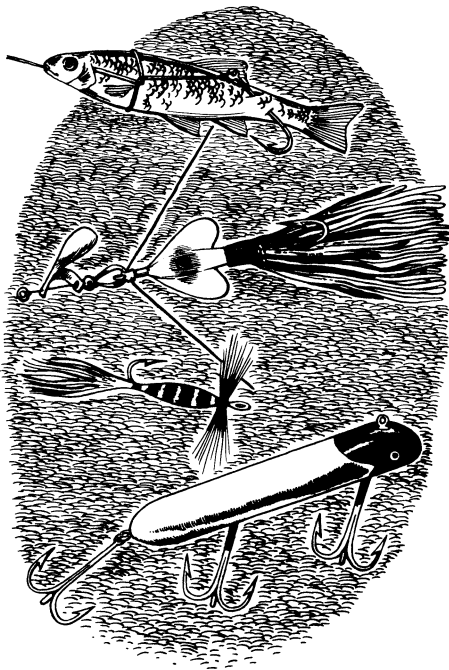
Bluegills from 2-inch fingerlings up to fish 1½ ounces in weight are of intermediate size. This size group is scarcely useful to bass or fishermen. A pond that provides good fishing has 70 percent or more of its total poundage in usable-size fish. When the total weight of intermediate-size fish is more than 25 percent of your pond's total poundage, your fishing will usually be poor.

If you have large bass but cannot catch them, you have too many bluegills in the intermediate size and too few bass—less than 1 pound of bass for every 6 or 7 pounds of bluegills. To correct this, reduce the number of intermediate-size bluegills and get a restocking of bass.

You can reduce the number of intermediate-size bluegills by passing a 50- or 60-foot seine of half-inch mesh through the shallow parts of your pond. Throw back all the bluegills that are big enough for fishing. Destroy all the ½- to 2-ounce bluegills. Don't remove any bass you catch in the seine because you will need them to help control the bluegills. You should seine your pond every week or 10 days until you see that most of the intermediate-size bluegills have grown into useful size.

Occasionally, you may have too many bass of 4- to 8-inch length. These intermediate-size bass can be thinned out easily by fishing, since there are never more than a few score per acre.

With experience, you can reduce your crowded bluegill population by applying rotenone at the edges of the pond in early fall. Apply the rotenone 3 or 4 times at intervals of 2 weeks, about noon on still days. Use 1 pound of 5-percent rotenone for each 300 linear feet of edge. Apply it in a line about 25 feet from



Bass are caught with live baits and artificial lures.

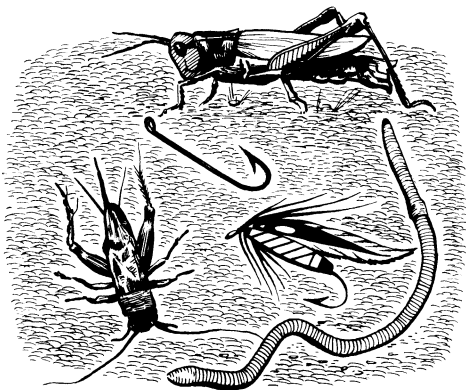
shore. Do not use this rotenone treatment in ponds of less than 2 acres.

If neither seining nor the use of rotenone at the pond edge is feasible, kill the whole population in late summer. Restock after 2 weeks with bluegills and get a new stocking of bass the next spring.

Heron, kingfishers, and other fish-eating birds eat mostly intermediate-size fish. Thus they help you have more usable-size fish. Turtles eat mostly weeds and dead fish; so turtles are only a nuisance to the fisherman, eating from his string of fish or from his bait.

### When to begin fishing a new pond

Your pond is ready to fish when the bass have reproduced successfully. This occurs the first spring after the bass are stocked if they mature correctly. The way to be



Insects, worms, and artificial flies are good baits for bluegills.

sure of this is to catch some of the 1- or 2-inch bass in a minnow seine. If you catch no fingerling bass in the seine, you do not have a successfully stocked pond, and your pond needs restocking immediately. Use the same number you would for a new pond.

Even bluegills should not be fished until the bass have spawned. By delaying the bluegill fishing you avoid having too many intermediate-size bluegills in succeeding years.

### How hard to fish

It is often said, "You can't overfish a pond with hook-and-line fishing." This is true in one sense, but not quite in another. Frequent fishing is good for your fish population, since the remaining fish grow bigger. Fortunately, heavy fishing does not deplete your pond permanently. It does produce alternate periods of good fishing and poor—good for a week or two, then poorer fishing for a week or two. Extremely heavy fishing affects fishing even longer. To have the best fishing each time you go, moderate fishing is the way. If, on the other hand, you want the greatest total yield—200 to 250 pounds per acre—fish the pond as hard and as often as you can.

If you catch too many small bass, fish them harder and take out those you catch. The ones you don't catch will grow larger and will soon be usable size. Also stimulate the bluegills to spawn by fishing harder for adult bluegills and by increasing their food supply with more fertilizer.

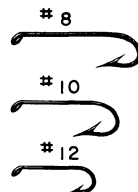
The best bluegill fishing usually is at their spawning beds. Don't be reluctant to take the bluegills off the beds or you won't harvest your crop as you should.

To have the best bass fishing, you must fish both the bass and the usable-size bluegills. You get the most return when you harvest each year 3 to 4 pounds of bluegills to 1 pound of bass. However, most of your bass will be caught from fall to spring and bluegills from spring to fall.

After your new pond is ready to fish, you do not need to restrict your fishing as to seasons or sizes of fish. You should fish during the spawning seasons or any other time. When you catch a fish large enough to eat, its removal and use is good sense.

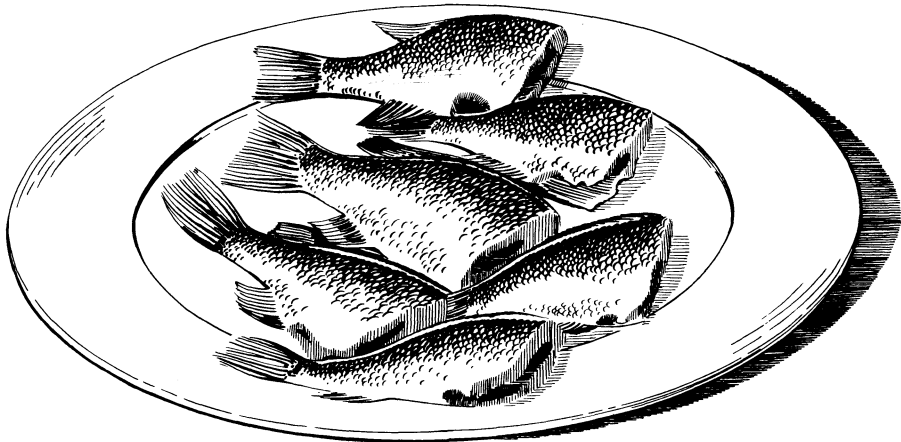


**BASS**



**BLUEGILL**

Use the right size of hook.



Good food is a product of good fishponds.

### Use the baits you like best

No bait is good enough to deplete your fishpond. Minnows, crawfish, spring lizards, and intermediate-size bluegills are good bait for bass. Artificial flies, plugs, spoons, and similar lures will catch them, too. An occasional change from one to the other will increase your catch.

Bluegills like almost any kind of worm, insect larvae, or the insects themselves. Earthworms, catalpa worms, and meal worms are common baits. Crickets, roaches, grasshoppers, and katydids are equally good. The most successful fishermen take

both worms and crickets or other similar varieties on their fishing trips. Most bluegills are caught with the baited hook on the pond bottom. Remember they feed daily on the wormlike larvae there.

The second most important bluegill fishing is done in the evening and early morning with artificial flies. The bluegills take these on top of the water, or just below it, as they would any insect that drops to the surface.

The size of the hook is important. For bluegills, since their mouths are small, a number 12, 10, or 8 is the correct size. Use the larger hooks, 6/0, 2/0, or 2, for bass.

## TROUBLES AND TREATMENTS

You may have certain troubles that interfere with good fishing. Here are some of the common ones with suggested treatments:

**Wild fish:** If wild fish invade your pond before stocking, use rotenone to kill all the fish. (See page 6.)

**Submerged waterweeds:** You must destroy them before you can improve your fish population. (See page 11.)

**Failure of bass to reproduce successfully the first year:** Restock at once with 100 to 150 fingerlings. (See pages 6 and 16.)

**Too many small bass:** Take out every one you catch. The few you fail to catch will grow larger. Also, stimulate bluegills to spawn by fishing adult bluegills harder and increasing their food supply by adding more fertilizer. (See page 16.)

**Failure to catch bass:** Your pond has too few bass and too many intermediate-size bluegills. Remove the intermediate-size bluegills with a 50- or 60-foot seine of half-inch mesh. (See page 15.)

**Partial or complete die off:** This may be due to poisoning by insecticides, such as DDT, toxaphene, aldrin, or chlordane. If you lose more than half of the pond's poundage, kill the remaining fish and restock. (See page 7.)

**If you cannot decide what is wrong:** Ask an experienced pond man to help you, or kill all the fish with rotenone and restock. This will correct any unsatisfactory fish population.